KENDAL POWER STATION MONTHLY EMISSIONS REPORT
Atmospheric Emission License 17/4/AEL/MP312/11/15

1 RAW MATERIALS AND PRODUCTS

Raw Materials and Products	Raw Material Type	Units	Maximum Permitted Consumption Rate	Consumption Rate May-2022
	Coal	Tons	2 260 000	955 276
	Fuel Oil	Tons	5 000	1958,78

Production Rates	Product / By-Product Name	Units	Maximum Production Capacity Permitted	Production Rate May-2022
	Energy	MWh(MW)	3,153,600 (4380)	3 043 334,00
	Ash	Tons	770 000	313 999,2
	RE Ash	kg/MWh	not specified	0,260

2 ENERGY SOURCE CHARACTERISTICS

Coal Characteristic	Units	Stipulated Range	Monthly Average Content
Sulphur Content	%	<1 (%)	0,800
Ash Content	%	40 (%)	32,870

3 EMISSION LIMITS (mg/Nm³)

Associated Unit/Stack	PM	SO₂	NOx
Unit 1	100	3500	1100
Unit 2	100	3500	1100
Unit 3	100	3500	1100
Unit 4	100	3500	1100
Unit 5	100	3500	1100
Unit 6	100	3500	1100

4 ABATEMENT TECHNOLOGY (%)

Associated Unit/Stack	Technology Type	Efficiency May-2022	Technology Type	Utlization May-2022
Unit 1	ESP + SO₃	99,8%	SO₃	0,0%
Unit 2	ESP + SO₃	Off-line	SO₃	Off-line
Unit 3	ESP + SO₃	99,9%	SO₃	0,0%
Unit 4	ESP + SO₃	99,4%	SO₃	0,0%
Unit 5	ESP + SO₃	99,5%	SO₃	0,0%
Unit 6	ESP + SO₃	99,7%	SO₃	0,0%

Unit 1, 2,3,4,5 & 6 sulphur utilization readings not available because KEPDAT A04 and KEPDATA05 failed. The hardware is being replaced

Note : ESP plant does not have bypass mode operation, hence plant 100% Utilised.

5 MONITOR RELIABILITY (%)

Associated Unit/Stack	PM	SO₂	NO	O₂
Unit 1	99,4	99,7	99,2	100,0
Unit 2	Off-line	Off-line	Off-line	Off-line
Unit 3	98,7	100,0	100,0	96,5
Unit 4	99,5	99,1	97,2	70,6
Unit 5	99,7	100,0	100,0	99,7
Unit 6	90,1	99,9	100,0	73,0

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

Unit 3 and 6 O_2 monitor reliability low due to defective monitors

6 EMISSION PERFORMANCE

Table 6.1: Monthly tonnages for the month of May 2022

Associated Unit/Stack	PM (tons)	SO₂ (tons)	NOₓ (tons)	CO₂
Unit 1	91,4	0	0	0
Unit 2	Off-line	Off-line	Off-line	Off-line
Unit 3	50,3	2 840	1 052	256 777
Unit 4	228,8	3 924	992	223 751
Unit 5	267,8	4 438	1 620	478 214
Unit 6	148,5	3 601	1 490	292 020
SUM	786,84	14 803	5 154	1 250 763

Table 6.2: Operating days in compliance to PM AEL Limit - May 2022

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average PM (mg/Nm³)
Unit 1	25	4	0	0	4	59,9
Unit 2	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
Unit 3	28	3	0	0	3	40,5
Unit 4	25	2	0	4	6	167,3
Unit 5	24	4	0	3	7	137,5
Unit 6	26	3	0	2	5	73,4
SUM	128	16	0	9	25	

Table 6.3: Operating days in compliance to SO₂ AEL Limit - May 2022

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average SOx (mg/Nm³)
Unit 1	29	0	0	0	0	-40,3
Unit 2	Off-line	Off-line	Off-line	Off-line	Off-line	Off-line
Unit 3	31	0	0	0	0	1 984,8
Unit 4	31	0	0	0	0	2 381,7
Unit 5	31	0	0	0	0	2 024,2
Unit 6	31	0	0	0	0	2 346,5
SUM	153	0	0	0	0	

Table 6.4: Operating days in compliance to NOx AEL Limit - May 2022

Associated Unit/Stack	Normal	Grace	Section 30	Contravention	Total Exceedance	Average NOx (mg/Nm³)
Unit 1	29	0	0	0	0	-12,6
Unit 2	0	Off-line	Off-line	Off-line	Off-line	Off-line
Unit 3	31	0	0	0	0	734,4
Unit 4	31	0	0	0	0	597,0
Unit 5	31	0	0	0	0	731,5
Unit 6	30	0	0	1	1	971,4
SUM	152	0	0	1	1	

Note: NOx emissions is measured as NO in PPM. Final NOx value is expressed as total NO_2

Table 6.5: Legend Description

Condition	Colour	Description
Normal		Emissions below Emission Limit Value (ELV)
Grace		Emissions above the ELV during grace period
Section 30		Emissions above ELV during a NEMA S30 incident
Contravention		Emissions above ELV but outside grace or S30 incident conditions

Figure 1: Kendal Unit 1 PM Emissions - May 2022

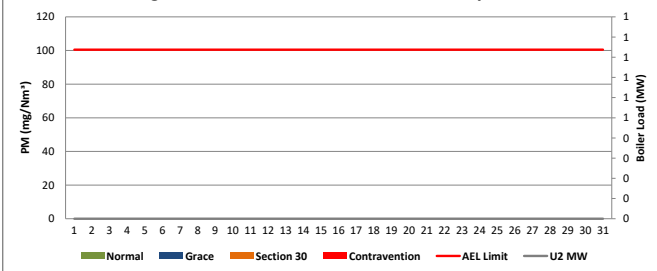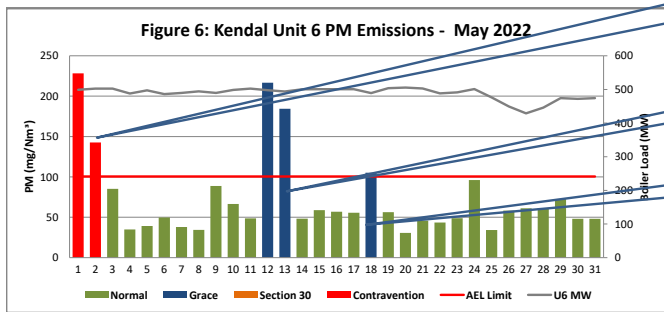The high emissions can be attributed to on the light up conditions.
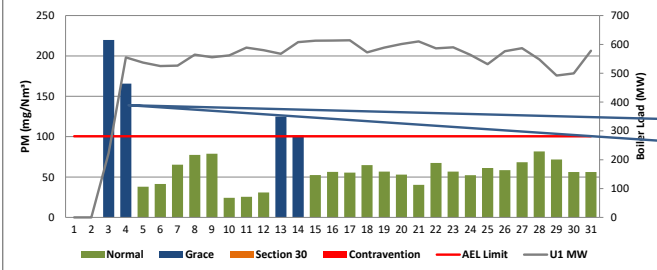
Figure 2: Kendal Unit 2 PM Emissions - May 2022
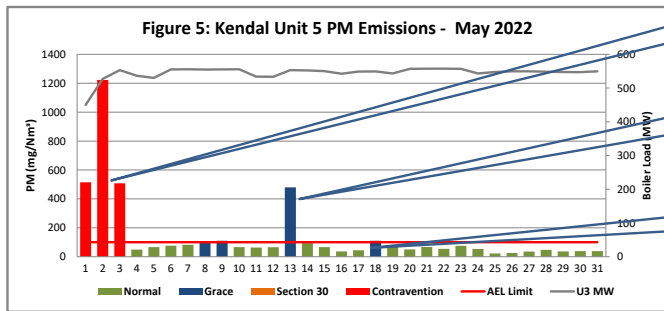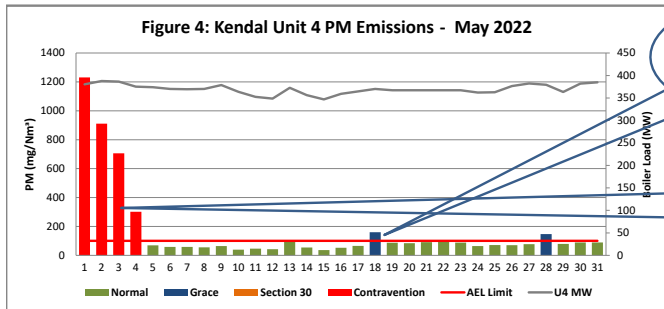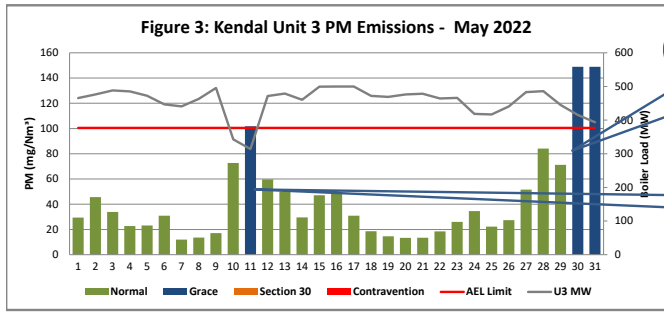
Figure 3: Kendal Unit 3 PM Emissions - May 2022

High PM emissions can be attributed to ash back logs due to Dust Handling Plant out of service (due to compatment high levels).

Unit hot start-up

Legend: Normal | Grace | Section 30 | Contravention | AEL Limit | U3 MW

Figure 4: Kendal Unit 4 PM Emissions - May 2022

High PM emissions on the 18th can be attributed to SO3 plant out of service due to water leak on the sulphur line to the units.

High PM emissions can be attributed to DHP out of service due to compatment levels.

Legend: Normal | Grace | Section 30 | Contravention | AEL Limit | U4 MW

Figure 5: Kendal Unit 5 PM Emissions - May 2022

High PM emissions can be attributed to No sulphur flow in the so3 plant.

High PM emissions on the 8 &9 can be attributed to precip knife gates 1-7 that were closed due to DHP top banker lever high.

High PM emissions on the 18th can be attributed to SO3 plant out of service due to water leak on the sulphur line to the units.

Legend: Normal | Grace | Section 30 | Contravention | AEL Limit | U3 MW

High PM emissions on the 1st can be attributed to precip fields 11 -14, 21-25 and 31 -34, 41- 44 dripped.

High PM emissions on the 12th can be attributed to SO3 plant not running because of burner outlet temperature reading low, and no sulphur flow.

High PM emissions on the 18th can be attributed to SO3 plant on hold mode due to water leak on the sulphur line to the units

Figure 6: Kendal Unit 6 PM Emissions - May 2022

Legend: Normal | Grace | Section 30 | Contravention | AEL Limit | U6 MW

Figure 7: Kendal Unit 1 SO₂ Emissions - May 2022
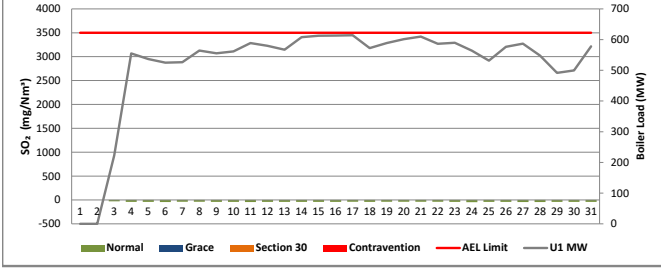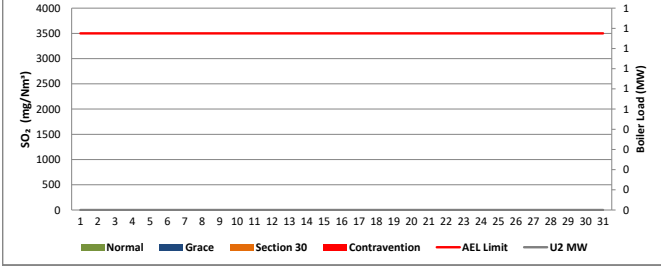

Figure 8: Kendal Unit 2 SO₂ Emissions - May 2022

Figure 9: Kendal Unit 3 SO₂ Emissions - May 2022
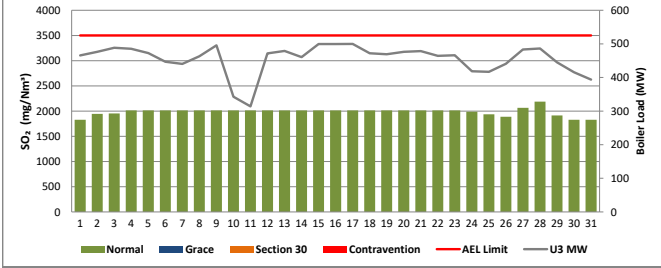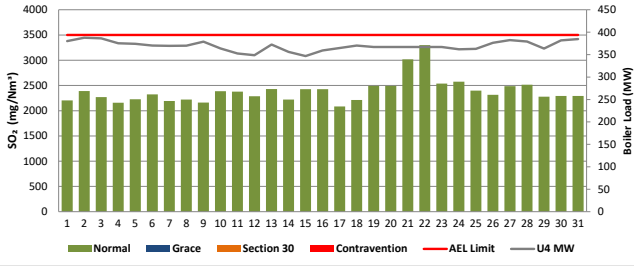
Figure 10: Kendal Unit 4 SO₂ Emissions - May 2022
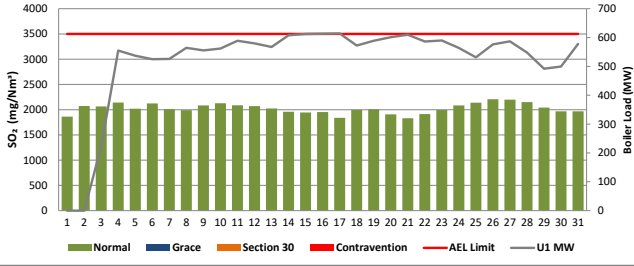

Figure 11: Kendal Unit 5 SO₂ Emissions - May 2022

Figure 12: Kendal Unit 6 SO₂ Emissions - May 2022
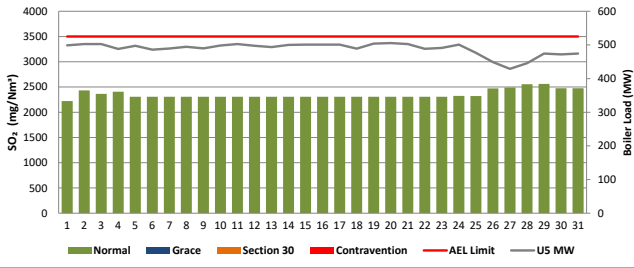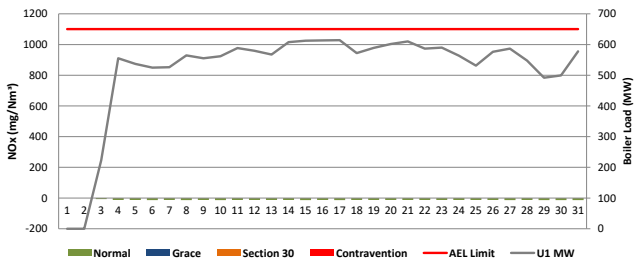

Figure 13: Kendal Unit 1 NOx Emissions - May 2022
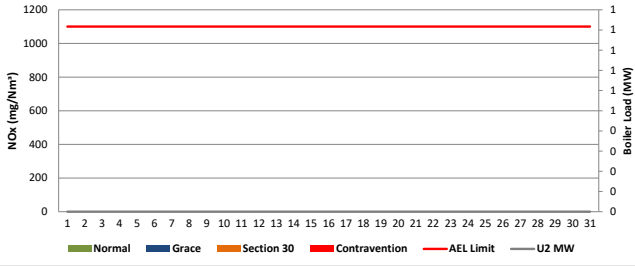
Figure 14: Kendal Unit 2 NOx Emissions - May 2022
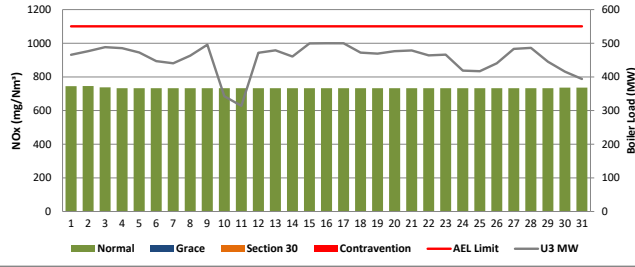

Figure 15: Kendal Unit 3 NOx Emissions - May 2022

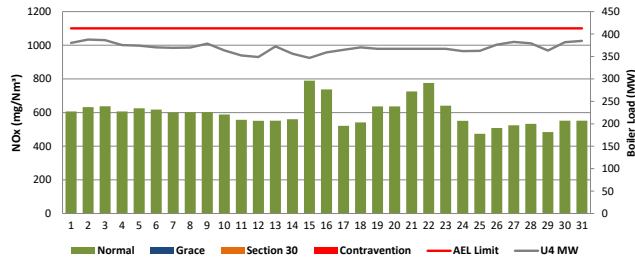Figure 16: Kendal Unit 4 NOx Emissions - May 2022

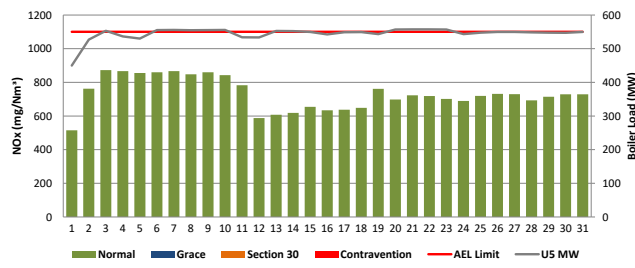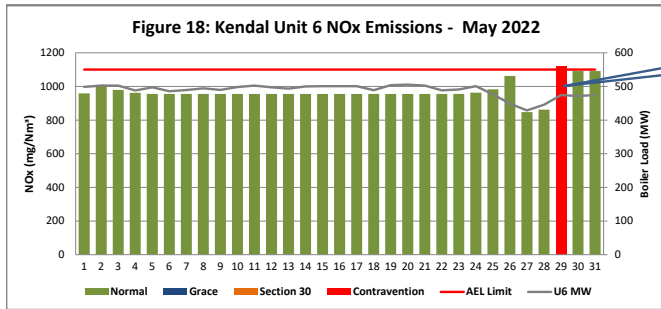Figure 17: Kendal Unit 5 NOx Emissions - May 2022

Figure 18: Kendal Unit 6 NOx Emissions - May 2022

Unit 6 high NOx emissions can be attributed to burner tils and dampers which were not in correct position and defective O₂ monitor.

7 COMPLAINTS

There were no complaints for this months

Source Code / Name	Root Cause Analysis	Calculation of Impacts / emissions associated	Dispersion modeling of pollutants where applicable	Measures implemented to prevent reoccurrence

ADDENDUM TO MONTHLY EMISSIONS REPORT

Abatement Technology-Table 4

In order to achieve the required operational dust removal efficiency based on measured values, several assumptions such as
- Coal ash content (%) and burnt rate mass
- Fly : Coarse ash ratio of 80:20 - 80% of fly-ash mass obtained from burnt coal goes to ESP
- Measurement of dust emission by Dust Monitor over a period of time (monthly)

Operational Dust Removal Efficiency

η = (1 – (Output/Input))x 100

η = 1 - $\frac{(DustEmissionFromAQR\ ReportDustMonitor(tons)}{(CoalBurnt(tons)*\%AshContent*80\%)}$ X 100

Monitor Reliability-Table 5
In terms of the minimum emissions standard, the requirement is that a monitor should be 80% reliable on a monthly average.
The **monitor reliability** refers to **data reliability** because the assumed value of 98% reliability is compared to the dust concentration signal. If the dust concentration signal is above 98% opacity,the data information is no longer reliable because the monitor reading is out of its maximum reading range. The data reliability looks at how many times did the dust concentration signal go above 98% over a period of time e.g 24hours
The formula is as follows:
= (1 – (count hours above 98%/24hours))x 100

Emissions Performance:

➤ Average velocity values from the latest correlation report were used on the gaseous emissions on Unit 1, 2, 3, 4 due to defective CEMS monitors and velocity correction factors were set M=1 and C=0
➤ Avarage emissions for Unit 3 and 6 SO2, NOx, CO2, moisture and Unit 6 flow was used from the QAL2 parallel report due to defective monitors.
➤ Avarage emissions for Unit 4 on the 15th and 16th SOx and NOx was used from QAL2 and flow from the 2020 Correlation report.
➤ Unit 6 high NOx emissions can be attributed to burner tils and dampers are not in correct position.

➤ Unit 2 was still offload during this month for Genera Overhaul (GO).

   Unit 1
   Findings: The high emissions can be attributed to on the light up conditions.
    Resolution:

   Unit 3
   Findings: The high emissions can be attributed to Unit hot start-up, ash back logs Dust Handling Plant out of service, due to compatment levels high.
   Resolution: The DHP was returned back to service after repairs

   Unit 4
   Findings: High PM emissions can be attributed to DHP out of service due to compatment levels and SO3 plant out of service due to water leak on the sulphur line to the units.
   Resolution: The plant was repaired

   Unit 5
   Findings: High PM emissions can be attributed to DHP standing due to compatments that were full, SO3 plant out of service due to water leak on the sulphur line to the units, precip field 11 kept on tripping , on the 8th & 9th precip knife gages 1-7 were closed due to DHP top bunker lever high.
   Resolution: The DHP was returned back to service after repairs

   Unit 6
   Findings: High PM emissions on the 1st can be attributed to precip fields 11 -14, 21-25 and 31 -34, 41- 44 dripped. On the 12th can be attributed to SO3 plant not running because of burner outlet temperature reading low, and no sulphur flow. On the 18th can be attributed to SO3 plant on hold mode due to water leak on the sulphur line to the units.
   Resolutions: Plant was repaired